This listing of claims will replace all prior versions and listings of claims in this application:

Listing of Claims

1. (Currently amended) A method for generating a mathematical model of thermal steady state printing characteristics of a thermal printing system using a computing device, the thermal printing system comprising a thermal printer having a thermal head incorporating a plurality of energisable heater elements and a heat sink, and a thermographic material, said method comprising:

- making a reference printout on the thermographic material, said reference printout comprising several printed regions with each of the several printed regions being printed with a different steady state amount of heat energy delivered to the heater elements associated with that region,
- determining a measure of ~~the~~ graphical output as a function of at least a parameter relating to temperature of the heat sink ~~temperature~~ for each of the several printed regions measured in a zone of each region where the graphical output was printed in a thermal steady state,
- establishing the mathematical model by determining a best fit relationship between the measures of the graphical output as [[a]] the function of at least the parameter related to the heat sink temperature and the steady state amounts of heat energy.

2. (Currently amended) A method according to claim 1, wherein the heat energy E_n is represented by a given equivalent time (t_{exc}) used for powering at least one of the heater ~~element~~ elements with an equivalent constant power (P_0), $E_n=t_{exc}*P_0$.

3. (Currently amended) A method according to claim 1, furthermore comprising, while making the reference printout, logging of parameters that are determinative ~~to~~ of the graphical output measure.

4. (Currently amended) A method according to claim 1, comprising establishing a table (T) of data comprising ~~the~~ a steady state graphical output ~~function~~ measure (d_n), and the ~~used~~ steady state amount of energy (E_n or t_{exc}) giving an implicit relationship between the steady state graphical output ~~function~~ measure (d_n) and its controlling ~~parameters~~ parameter (E_n or t_{exc}).

5. (Currently amended) A method according to claim 4, the table (T) furthermore comprising ~~the~~ parameters (P_n) that are determinative ~~to~~ of the steady state graphical output measure (d_n).

6. (Original) A method according to claim 4, wherein the best fit relationship is a parametrisable function (f( )), being defined by a set of unknown coefficients (a,b,c,d, . . .) found using a curve fitting process on the table (T).

7. (Currently amended) The method according to claim 1, wherein a printing pattern of said reference printout is selected so that ~~the~~ pixels being printed do not interact with each other.

8. (Currently amended) A method for generating a mathematical model of thermal steady state printing characteristics of a thermal printing system using a computing device, the thermal printing system comprising a thermal printer having a thermal head incorporating a plurality of energisable heater elements and a heat sink, and a thermographic material, said method comprising:

- making a reference printout on the thermographic material, said reference printout comprising several printed regions with each of the several printed regions being printed with a different steady state amount of heat energy (E_n) delivered to the heater elements associated with that region,

- determining a measure of ~~the~~ graphical output (d_n) as a function of at least a parameter relating to a temperature of the heat sink ~~temperature~~ for each of the several printed regions measured in a zone of each region where the graphical output (d_n) was printed in a thermal steady state,

- establishing the mathematical model by determining a best fit relationship between the measures of the graphical output (d_n) as [[a]] the function of at least the parameter related to the heat sink temperature and the steady state amounts of heat energy (E_n), wherein the best fit relationship is given by $d_i=f(t_{exc})$ where t_{exc} is an excitation time of a heater element and this relationship is corrected when using the printing system at a different line time by adding an offset Δt_{exc} to t_{exc}, .Δt_{exc} being found as ~~the~~ a value that fulfills ~~the equation~~

$$\sum_{i=0}^{\infty}\frac{1}{(2i+1)^2}\cdot\left[e^{-(2i+1)^2\left(\tau_{line}^{ref}-\tau_{exc}\right)}-e^{-(2i+1)^2\tau_{line}^{ref}}\right]=$$

$$\sum_{i=0}^{\infty}\frac{1}{(2i+1)^2}\cdot\left[e^{-(2i+1)^2\left(\tau_{line}-\tau_{exc}-\Delta\tau_{exc}\right)}-e^{-(2i+1)^2\tau_{line}}\right],$$

wherein τ_{exc}, τ_{line} and τ_{line}^{ref} are dimensionless parameters related to a supporting layer, $\tau_{exc}=\frac{a\pi^2}{4d_l^2}t_{exc}$, $\tau_{line}=\frac{a\pi^2}{4d_l^2}t_{line}$ and $\tau_{line}^{ref}=\frac{a\pi^2}{4d_l^2}t_{line}^{ref}$, where d_l is thickness of the supporting layer and t_{line}^{ref} is a reference line time.

9. (Currently amended) The method according to claim 1, wherein said graphical output (d_n) is a pixel with a certain colour spectral density in ~~the centre~~ a center of the pixel and/or a pixel with a certain size defined by a perimeter having a given colour spectral density, to be reproduced on said thermographic material ~~(10)~~.

10. (Currently amended) A method for driving a thermal print head of a thermal printing system comprising a thermal printer having the thermal print head incorporating a plurality of energisable heater elements and a heat sink, and a thermographic material, said method comprising:

in a first mode establishing a mathematical model by:

- making a reference printout on the thermographic material, said reference printout comprising several printed regions with each of the several printed regions being printed with a different constant amount of heat energy delivered to the heater elements associated with that region,
- determining a measure of ~~the~~ graphical output as a function of at least a parameter related to a temperature of the heat sink ~~temperature~~ for each of

the several printed regions measured in a zone of each region where the graphical output was printed in a thermal steady state,

- establishing the mathematical model by determining a best fit relationship between the measures of the graphical output and the constant amounts of heat energy, and, in a second mode:
- determining a heat energy to be supplied to at least one energisable heater element in accordance with the mathematical model for printing of an image on [[a]] the thermographic material using [[a]] the thermal printing system comprising [[a]] the thermal printer having [[a]] the thermal print head incorporating [[a]] the plurality of energisable heater elements and [[a]] the heat sink, and a current value of the parameter related to the heat sink temperature.

11. (Currently amended) A method according to claim 10, wherein the heat energy E_n is represented by a given equivalent time (t_{exc}) used for powering at least one of the heater ~~element~~ elements with an equivalent constant power (P_0), $E_n=t_{exc}*P_0$.

12 (Currently amended) A method according to claim 10, furthermore comprising, while making the reference printout, logging of parameters that are determinative ~~to~~ of the graphical output measure.

13. (Currently amended) A method according to claim 10, comprising establishing a table (T) of data comprising ~~the~~ a steady state graphical output ~~function~~ measure (d_n), and the ~~used~~ steady state amount of energy (E_n or t_{exc}), giving an implicit relationship between the graphical output ~~function~~ measure (d_n) and its controlling ~~parameters~~ parameter (E_n or t_{exc}).

14. (Currently amended) A method according to claim 13, the table (T) furthermore comprising ~~the~~ parameters (P_n) that are determinative ~~to~~ of the graphical output measure (d_n).

15. (Original) A method according to claim 13, wherein the best fit relationship is a parametrisable function (f( )), being defined by a set of unknown coefficients (a,b,c,d, . . .) found using a curve fitting process on the table (T).

16. (Currently amended) A method according to claim 10, wherein a printing pattern of said reference printout is selected so that ~~the~~ pixels being printed do not interact with each other.

17. (Currently amended) A method, for driving a thermal print head of a thermal printing system comprising a thermal printer having the thermal print head incorporating a plurality of energisable heater elements and a heat sink, and a thermographic material, said method comprising:

in a first mode establishing a mathematical model by:

- making a reference printout on the thermographic material, said reference printout consisting of several printed regions with each of the several printed regions being printed with a different constant amount of heat energy (E_n) delivered to the heater elements <u>associated with that region</u>,
- determining a measure of ~~the~~ graphical output (d_n) as a function of at least a parameter related to <u>a temperature of</u> the heat sink ~~temperature~~ for each of the several printed regions measured in a zone of each region where the graphical output <u>measure</u> (d_n) was printed in a thermal steady state,
- establishing the mathematical model by determining a best fit relationship between the measures of the graphical output (d_n) and the constant amounts of heat energy, and,

in a second mode:

- determining a heat energy to be supplied to at least one energisable heater element in accordance with the mathematical model for printing of an image on [[a]] <u>the</u> thermographic material using [[a]] <u>the</u> thermal printing system comprising [[a]] <u>the</u> thermal printer having [[a]] <u>the</u> thermal print head incorporating [[a]] <u>the</u> plurality of energisable heater elements and [[a]] <u>the</u> heat sink, and a current value of the parameter related to the heat

sink temperature, wherein the best fit relationship is given by $d_i=f(t_{exc})$ where t_{exc} is an excitation time of a heater element and this relationship is corrected when using the printing system at a different line time by adding an offset $.\Delta t_{exc}$ to t_{exc}, $.\Delta t_{exc}$ being found as ~~the~~ a value that fulfills ~~the equation~~

$$\sum_{l=0}^{\infty}\frac{1}{(2l+1)^2}\cdot\left[e^{-(2l+1)^2(\tau_{line}^{ref}-\tau_{exc})}-e^{-(2l+1)^2\tau_{line}^{ref}}\right]=$$

$$\sum_{l=0}^{\infty}\frac{1}{(2l+1)^2}\cdot\left[e^{-(2l+1)^2(\tau_{line}-(\tau_{exc}+\Delta\tau_{exc}))}-e^{-(2l+1)^2\tau_{line}}\right],$$

wherein τ_{exc}, τ_{line} and τ_{line}^{ref} are dimensionless parameters related to a supporting layer, $\tau_{exc}=\frac{a\pi^2}{4d_l^2}t_{exc}$, $\tau_{line}=\frac{a\pi^2}{4d_l^2}t_{line}$ and $\tau_{line}^{ref}=\frac{a\pi^2}{4d_l^2}t_{line}^{ref}$, where d_l is thickness of the supporting layer and t_{line}^{ref} is a reference line time.

18. (Currently amended) A method according to claim 10, wherein said graphical output (d_n) is a pixel with a certain colour spectral density in ~~the centre~~ a center of the pixel and/or a pixel with a certain size defined by a perimeter having a given colour spectral density, to be reproduced on said thermographic material.

19. (Currently amended) A ~~control unit for use with a~~ thermal printer for printing an image onto a thermographic material, the thermal printer ~~having~~ comprising:

a control unit; and

a thermal head incorporating a plurality of energisable heater elements, the thermal head being driven by the control unit, wherein the control unit ~~being~~ is adapted to control ~~the~~ driving of the thermal printer so as to make a reference printout on the thermographic material, said reference printout comprising several printed regions, the driving of the thermal printer being such that each of the several printed regions is printed with a different constant amount of heat energy delivered to the heater elements, the control unit furthermore being adapted to determine a measure of the

graphical output for each of the several printed regions measured in a zone of each region where the graphical output was printed in a thermal state, and the control unit ~~furthermore being adapted to establish~~ establishing a mathematical model of thermal steady state printing characteristics by determining a best fit relationship between the ~~measures~~ measure of the graphical output for each of the several printed regions and the different constant amounts of heat energy for each of the several printed regions.

20. (Currently amended) The thermal printer of ~~A control unit according to~~ claim 19, the control unit furthermore being adapted for determining a heat energy to be supplied to at least one energisable heater element in accordance with the mathematical model.

21-22. (Canceled)

23. (Currently amended) A machine readable data storage device storing ~~the~~ a computer program product ~~of claim 22.~~ for executing a method for generating a mathematical model of thermal steady state printing characteristics of a thermal printing system using a computer device, the thermal printing system comprising a thermal printer having a thermal head incorporating a plurality of energisable heater elements and a heat sink, and a thermographic material, said method comprising:

making a reference printout on the thermographic material, said reference printout comprising several printed regions with each of the several printed regions being printed with a different steady state amount of heat energy delivered to the energisable heater elements;

determining a measure of graphical output as a function of at least a parameter related to a temperature of the heat sink for each of the several printed regions measured in a zone of each of the several printed regions where the graphical output was printed in a thermal steady state; and

establishing the mathematical model by determining a best fit relationship between the measure of the graphical output as a function of at least the parameter related to the temperature of the heat sink and the steady state amount of heat energy for each of the several printed regions.

24. (New) A method according to claim 1, wherein graphical output measure is a measure of density information.

25. (New) A method according to claim 1, wherein graphical output measure is a measure of pixel size.

26. (New) A method according to claim 1, wherein the temperature of the heat sink is measured at multiple positions of the heat sink.

27. (New) A method according to claim 26, wherein each of said multiple positions corresponds to one of said heater elements.